REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 1, 3-13 and 15-31 are pending in this application.

Objection to the Claims:

Claims 5, 12, 16, 17 and 24 were amended in accordance with the Examiner's helpful suggestions to overcome the informalities identified in Section 8 (pages 2-3) of the Office Action.

Rejection under 35 U.S.C. §112:

Claims 1, 3-13 and 15-31 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite.

Claims 11 and 23 have been amended to require "the variable values" in accordance with the Examiner's interpretation and helpful comments.

Claims 1, 13, 25 and 29 have been amended to require "~~similar~~corresponding contents." As described in the Remarks (page 19) of the Amendment filed September 4, 2007 "the control model and the control program mostly correspond (i.e., are similar) but may differ in some respects, for instance, in the order of processing (e.g., see order of B3, B5 in FIG. 3). According to the embodiment of the present invention, this difference is checked (26, 357, 358) to be abnormal or unacceptable based on results of control model simulation (20, 315) and control program execution (22, 335). This check is made with respect to each of relational linkages, which are predetermined to correspond or [be] similar to each other between the control model and the control program." In an attempt to provide even further clarity to this limitation, "similar" has been changed to --corresponding--. In order for a meaningful test for abnormality in a control model and/or control program to occur, the contents for making the relational linkage

between the control model and control program must correspond. This correspondence should not be viewed necessarily as a complete or identical match. That is, the control model and control program can be similar, but differ in some respects, such as the order of processing for example. A comparison between contents of the control model and control program which do not correspond would not result in a meaningful test. To draw an analogy, apples must be compared with other apples (a corresponding fruit), rather than apples being compared with oranges, to perform a meaningful comparison test. Accordingly, Applicant respectfully requests that the rejection under 35 U.S.C. §112, second paragraph, be withdrawn.

Rejections under 35 U.S.C. §102 and §103:

Claims 1 and 6-8 were rejected under 35 U.S.C. §102 as allegedly being anticipated by Whitehill et al. (U.S. '329, hereinafter "Whitehill"). Applicant respectfully traverses this rejection.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Each element of the claimed invention is not found in Whitehill. For example, Whitehill fails to disclose "testing presence or absence of abnormality in at least one of the control model and the control program with respect to each relational linkage; wherein the relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model," as required by independent claim 1 and its dependents.

In order to facilitate an understanding of the above-noted limitations an example embodiment described in the specification is provided below. In particular, the claim limitation "testing presence or absence of abnormality in at least one of the control model and the control program with respect to each relational linkage" will be described with reference to the example embodiment of Fig. 9 of the present application. Fig. 9 shows a process for testing for the presence or absence of an abnormality in the control mode and/or the control program. This process for testing is implemented by the synchronizing section 26 (see Fig. 2).

The control model and control program receive the same initial input data. Simulation of the control model and execution of the control program can thus take place under the same conditions. The simulation section 20 (see Fig. 2) simulates the control model, and the program execution section 22 (see Fig. 2) executes the control program in step 351. If both the control model and the control program have been suspended (yes in step 352 of Fig. 9) and execution of both the control model and control program have not yet completed (no in step 353 of Fig. 9), the synchronizing section 26 obtains execution position correspondence information stored in correspondence information storage section 18 (see Fig. 2). As illustrated in the left side of Fig. 5, the execution position correspondence information includes the proper execution position correspondence between the control model and the control program. For example, the proper corresponding execution position of "BASIC QUANTITY CALCULATION (B2)" in the control model is the portion of the control program labeled L1. As further examples, the proper corresponding execution positions between the control model: control program include the following as indicated on the left hand side of Fig. 5: (B3): L2; (B6): L3; (B5): L4 and (B7): L5.

In step 355 of Fig. 9, the suspend point of the control model and the suspend point of the control program are compared with the execution position correspondence information obtained

in step 354 to determine whether the suspend points of the control model and control program have a properly corresponding execution position. As an example, suppose the suspend point of the control model is in the portion of the model labeled "BASIC QUANTITY READING (B5)" and the suspend point of the control program is in the portion of the program labeled L4. In this case, the relational linkage (B5: L4) made between the operation results of the control model simulation by the simulation section 20 and the operation results of the control program executed by the program execution section 22 does not indicate an abnormality based on the execution position correspondence information of Fig. 5. Again, this execution position correspondence information, which indicates for example that B5 of the control model properly corresponds to L4 of the control program, is obtained in step 354.

As another example, suppose the suspend point of the control model is B5, but the suspend point of the control program is L3. In step 355, a determination is made that the position of the suspend point in the control model is not the same as the position of the suspend point in the control program based on the correspondence information obtained in step 354. As indicated in Fig. 5, control model position B5 does not properly correspond to control program position L3. That is, control model position B5 properly corresponds to control program position L4, not L3. Accordingly, by checking the execution position correspondence information in Fig. 5, the synchronizing section 26 can determine in this case that the suspend points of the control model and the control program are not in the same position (no in step 355). An indication of abnormality in step 356 will thus result. In this case, the relational linkage (B5: L3) made between the operation results of the control model simulation by the simulation section 20 and the operation results of the control program executed by the program execution section 22 indicates the presence of an abnormality based on the proper execution position correspondence

information provided in Fig. 5 which shows that an execution position B5 of the control model does not properly correspond to execution position L3 of the control program.

Pages 5-6 of the Office Action alleges that col. 6, lines 11-13 and 38-51 of Whitehill disclose the above limitations. Applicant respectfully disagrees. Col. 6, lines 11-13 states "when errors are encountered between actual and simulated results, the translation system is typically modified to correct these errors." Col. 6, lines 38-51 states "templates 38 basically serve as a target module shell or skeleton, and initially contain information and code needed within target modules. For example, a template may initially contain references to global information and the header files, a comment block, and various other information based on the particular type of target module being produced.... Function set 40 is utilized to replicate on the target system platform simulation tool functions residing within the simulation modules...."

The above-reproduced portions of Whitehill generally disclose correcting errors by modifying a translation system. These teachings of Whitehill generally correspond to Fig. 1 of the present application in which a control program is generated from a control model in step 102, and the generated control program is debugged in step 103 and 104 to correct any errors. However, while Whitehill discloses correcting errors, there is no teaching or suggestion of doing so in the specific manner required by independent claim 1 and its dependents. In particular, there is no teaching or suggestion of making relational linkages between corresponding operation results of a simulator which simulates operation of the control model and operation results of a program execution section which executes the control program, let alone testing for an abnormality with respect to a relational linkage based on correspondence information indicating a correspondence relationship between the control model and the control program.

Again, Whitehill generally discloses correcting errors in a translation system which enables direct transition from design simulation to a software implementation for a target system. At most, this corresponds generally to the testing process disclosed in Fig. 1 of the application. However, the invention of claim 1 is specifically directed to a detailed process for testing the control model control program (i.e., the detailed processing of steps 103 and 104 in Fig. 1). For example, the invention of claim 1 requires testing for abnormality with respect to a relational linkage made while producing operation results of a simulator and program execution section. Whitehill therefore fails to disclose, for example, the details associated with step 103 of Fig. 1. Whitehill merely and generally describes error correction without much detail at all.

Moreover, a relational linkage between a control model and control program based on correspondence information indicating a correspondence relationship between the control model and the control program produced from the control model is not disclosed by templates 38 or function set 40 as apparently alleged by the Office Action. Instead, template 38 merely provides predetermined portions of a target module shell. As explicitly indicated by Whitehill, these templates may contain references to global information, header files, or a comment block. Clearly, the global information, header files and comment block contained in the templates 38 do not establish a relational linkage. These portions are not even translated by the translation system. Functions 40 merely replicate simulation tool functions on the target system platform that reside within the simulation modules. The function set 40 is thus provided after correcting the model function (again, not translated) so as to be operable on the target system.

Dependent claim 8 further requires comparison between the operation results of a simulator and a program execution section involving variable values calculated by the simulation of the control model and variable values calculated by execution of the control program based on

the correspondence information. This feature is supported by, for example, the right-hand side of Fig. 5 which shows variable values of the control model and control program. Page 7 of the Office Action alleges that col. 9, line 16-23 of Whitehill discloses the above limitations. Applicant disagrees. Col. 9, lines 16-23 of Whitehill states:

> The resulting templates are searched at step 94 to replace specific functions with functions compatible with the target system platform. For example, certain functions in the simulation tool define data streams in a particular manner. These functions are replaced with functions (e.g., typically included within function set 40) for compatibility with the target system platform to enable information to be transferred between functional elements.

The above portion of Whitehill merely discloses replacing functions with other functions for compatibility with the target system platform to enable information transfer between functional elements. Replacing functions with other target system-compatible functions has absolutely nothing to do with comparison of operation results of a simulator and program execution section being implemented by comparison between variable values calculated by the simulation of the control model and variable values calculated by control program execution.

Applicant thus respectfully requests that the rejections under 35 U.S.C. §102 be withdrawn.

Claims 3-5, 9-12 and 25-31 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Whitehill in view of Duboc et al. (U.S. '995, hereinafter "Duboc"). Applicant respectfully traverses this rejection. Claims 3-5 and 9-12 depend directly or indirectly from independent claim 1. All of the above comments with respect to Whitehill apply equally to these claims. Duboc fails to resolve the above-described deficiencies of Whitehill.

Moreover, dependent claim 3 requires "wherein the relational linkage is made for one of the control model and the control program based on the setting of a break point which specifies a

suspend point of operation and for the other based on a setting of a corresponding break point based on the corresponding information." Page 8 of the Office Action alleges that col. 5, lines 6-15 of Duboc discloses this limitation. Applicant disagrees. Col. 5, lines 6-15 of Duboc states "A debug operation may include any number of debugging functions, including for example, single-step operations and multi-step operations for use in performing step-wise simulation, breakpoint operations to halt a simulation on occurrence of specific events...." In Duboc, a software level is converted to an LSI level, and a breakpoint is set to stop execution of the software converted to the LSI level based on the occurrence of specific events. For example, a user may select various conditional breakpoints such as the status of a program counter (PC) and/or bus values to stop a simulation (see col. 11, lines 47-57). In particular, a user may set breakpoints to stop a simulation in response to specific values being stored in the program counter (PC) or address or data bus. (See col. 12, lines 32-35). Selecting a breakpoint so that the simulation is stopped if specific values are stored in the program counter or address or data bus as described in Duboc fails to disclose or suggest a relational linkage being made for (i) a control model/control program based on the setting of a breakpoint and (ii) the control program/control model based on a setting of a corresponding breakpoint based on the correspondence information. That is, Duboc's breakpoint is selected so that simulation is stopped if various values are stored in a program counter or bus, but is not set in correspondence to a relational linkage. In contrast, claim 3 thus requires the setting of a breakpoint and a setting of a corresponding breakpoint based on the correspondence information. The user defined breakpoints in Duboc fail to teach or suggest setting a breakpoint in a control model/control program and setting a corresponding breakpoint in the control program/control model based on correspondence information.

Similar to independent claim 1, claim 25 requires, *inter alia*, "wherein said each relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model," and independent claim 29 requires, *inter alia*, "wherein said each relational linkage is made about corresponding contents between the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generator and the control program which is produced from the control model." For reasons discussed above, Whitehill fails to teach or suggest these limitations. Again, Whitehill generally discloses debugging of a translated program, but fails to teach or suggest the specific manner of testing for abnormality based on a relational linkage made about corresponding contents between a control model and a control program based on correspondence information. Duboc fails to resolve this deficiency of Whitehill.

Claim 13 was rejected under 35 U.S.C. §103 as allegedly being unpatentable over Whitehill, in view of Hines (U.S. '415). Claims 15-24 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Whitehill in view of Hines and further in view of Duboc. For reasons similar to those presented above, the combination of Whitehill and Hines, as well as the three-way combination of Whitehill, Hines and Duboc fails to teach or suggest "testing means for testing presence or absence of abnormality in at least one of the control model and the control program based on output operation results with respect to each relational linkage; wherein the synchronizing means makes said each relational linkage about corresponding contents between

the control model and the control program based on correspondence information which indicates a correspondence relationship between the control model which is provided at automatic generation of the control program by the automatic code generation means and the control program which is produced from the control model," as required by independent claim 13 and its dependent. Accordingly, even if Duboc were combined with Whitehill, the combination would not teach or suggest all the claim limitations required by independent claim 13 or its respective dependents. Accordingly, Applicant respectfully requests that these rejections under 35 U.S.C. §103 be withdrawn.

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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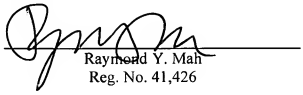
By: 
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